

Finding their own way

Research

Associate professor

Phillip McKerrow is taking knowledge learned from bats and applying it to developing robots that can navigate by themselves and also find survivors in a disaster area.

A bat flies through a cave and catches moths in the dark - even though it cannot "see" them.

What enables the bat to find the moths is echolocation - the perception of objects and their location from the echoes of chirps of ultrasonic energy off those objects.

Bats use it to navigate in the dark and in restricted spaces, such as in forests and inside buildings.

It is a sense of perception that humans don't normally possess.

If God had not made echolocating bats we would not believe it possible to recognise objects and navigate using ultrasonic sound waves.

My goal is to understand echolocation (sound navigation and ranging - SONAR) in air and how we can use it to autonomously navigate a mobile robot.

An important spin-off from this research will be improved training for the blind people who use ultrasonic mobility aids.

How can we build a mobile robot to drive around the paths in the botanic gardens without running over the garden?

In other research, we are also

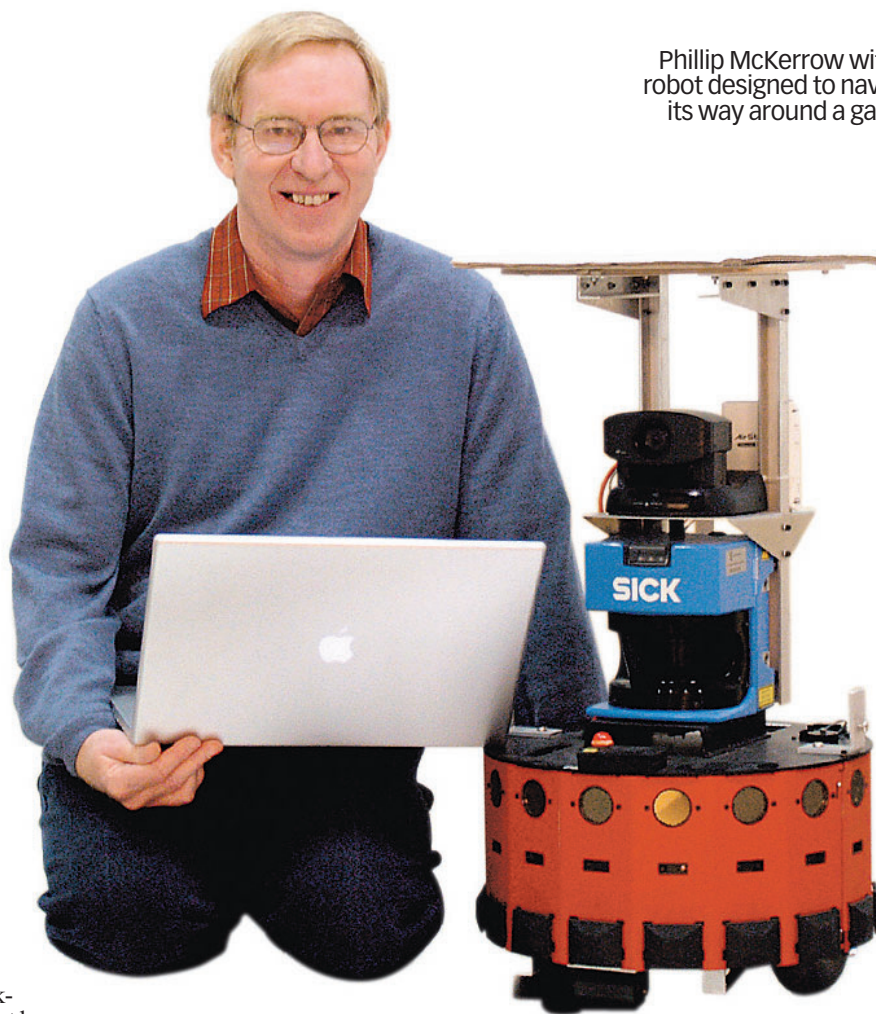
looking at how we can we design an aerial robot to fly into a partially collapsed building to look for casualties in a disaster.

Our goal is to understand how to recognise objects, build auditory maps of physical space, determine where a robot is, and navigate using echolocation.

We have developed ultrasonic sensing systems to recognise leafy plants and to discriminate between ground surfaces based on their roughness.

We have navigated a mobile robot in the botanic gardens by tracking the edges of paths.

Phillip McKerrow with his robot designed to navigate its way around a garden.



We are developing a mobile robot to follow paths using measurement of roughness, allowing it to stay off the gardens.

Also, we are developing autonomous aerial vehicles, in collaboration with Aeronautical Engineering at the University of Sydney, in an attempt to design and build a robot bat.

In addition to the garden-navigating robot, our paper about autonomous aerial robots for disaster search and rescue won the

best paper award at the Conference of the Association for Unmanned Vehicle Systems International in Florida in August.

Phillip McKerrow is Associate Professor in the School of Information Technology and Computer Science.

Q&A

Are you getting anywhere? We have made excellent progress in classifying objects, particularly rough surfaces.

Best part of your research? The interesting people I meet.

Funniest moment: Every time we crash a robot it helps to laugh rather than cry.

Ugliest moment: Feelings of frustration and unfairness when a grant application is unsuccessful. It is hard to get research funding in Australia.

Have you had a true "Eureka! I've found it!" experience? Yes - when working on difficult problems (such as understanding how to sense roughness) and the result of several months and years of thinking falls into place.

Has it made you rich? No.

What did you want to be when you were a kid? An astronaut.

Has your career followed a straight line? Roughly.

What would you change? Nothing. I am content with the way God has led me and provided for me. I have had many rich experiences.

Advice for young researchers? Find a mentor who is doing something you are interested in and who is doing excellent research and join them.

Next adventure? I have a series of audio tapes where a blind man explains how to sense objects and navigate with an ultrasonic mobility aid. I hope to reproduce his examples, understand them and apply the knowledge to flying an autonomous helicopter.

Website for further information:

www.uow.edu.au/~phillip/

Final comment: Experimental research like this involves difficult problems. It often takes time to develop experimental equipment and produce results, so you have to stick at it for decades, even when it is difficult to get funding or progress is slow.

Careers

Public relations exercise

School leavers interested in a career in public relations are invited to attend a "demystifying lecture" this month at APM Training Institute in North Sydney.

The PR industry is worth \$700 million and is becoming more popular among school leavers, however few understand what a PR career entails.

"There are many myths surrounding a career in public relations and television series like *Absolute Power* have done little to dispel these myths, APM general manager Paul Dumble said. "Many school leavers would believe that PR is about organising parties, working with celebrities and sipping champagne. However these activities would take up less than 10 per cent of an average PR's time, if at all."

The lectures will cover marketing, event management and PR industries. Lectures are capped at 30 participants per session and will

be held on November 18, 21 and 25 at APM, 213 Miller St, North Sydney.

Booking and timetables: www.apm.edu.au or phone 9954 7377.

Creative arts open night

The University of Wollongong's Faculty of Creative Arts will hold its first open night on Thursday for school leavers to talk to students and staff and view the work on display.

The open night will start at 7pm in building 25, room 107. Contact Tanya Barton-Saad 4221 5853, tanyab@uow.edu.au

NIDA summer session

The National Institute of Dramatic Art will offer short courses in theatre, film and TV from December 11 to January 28.

The Summer@NIDA courses are open to arts enthusiasts of all ages and include acting, directing, design, scriptwriting and technical production. Courses are tailored to suit skill level and age, with introductory sessions, master classes, studio projects, weekend intensives and two-hour NIDA bites sessions for adults, children and teenagers.

Visit www.nida.edu.au or phone 9697 7626.



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